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The Naudé species of South African Cicadellidae (Hemiptera). I. Species assigned to the genera *Bythoscopus* Germar, 1833, *Parabolitus* Naudé, 1926, and *Gcaleka* Naudé, 1926.

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Six of the species of South African Cicadellidae, originally described by Naudé (1926), are redescribed. A new genus *Iassomorphus* (Iassinae) is proposed for *Bythoscopus drakensteini* and *B. cedaranus; B. segregatus* is transferred to the genus *Batracomorphus* Lewis, 1834. *Parabolitus anceps* is transferred to the genus *Narecho* Jacobi, 1910 (Nirvaninae), with *N. erinae* Theron, 1971 as a synonym. Naudé's genus *Gcaleka*, consisting of the two species *G. laticephala* and *G. acuta*, is referred to the tribe Euscelini.

INTRODUCTION

In 1926 Naudé published the first comprehensive monograph on the Cicadellidae of South Africa. Apart from transcribing the original descriptions of all the species of leafhoppers previously known from this region, he also described 71 new species collected by F. W. Pettey in the Western Cape, J. C. Faure in the Orange Free State and E. S. Cogan and C. B. Hardenberg in Natal. Unfortunately Naudé did not deposit the types of these species in a museum or similar institution, but kept them in a small private collection where they were not available for study for many years. Only recently, in November 1971, he donated this collection to the National Collection of Insects, Plant Protection Research Institute, Pretoria and the present author is very grateful to the Director of this institute for permission to study the type specimens.

Examination of the collection revealed that at some time it must have been infested by *Anthrenus*, which destroyed some of Naudé's types. Of the following species the entire type series are unfortunately missing: *Deltocephalus africanus*, *D. cogani* var. *integer*, *Eugnathodus nigromaculatus*, *Empoasca lineatifrons* and *Erythroneura maculicosta*.

None of the types of the economically important *Balclutha mbila*, which was described earlier by Naudé (1924), are present in the collection either.

It should be noted that whereas the new species described from the Orange Free State and Natal probably have a fairly wide range, the distribution of the species collected in the Western Cape region, with its distinctive vegetation, topography and climate, is probably far more restricted. Being a keen mountaineer, Pettey apparently also collected some rare leafhoppers in rather inaccessible places, while searching for the Psyllidae, which were his primary interest.

IASSOMORPHUS gen. nov.

Type-species: *Bythoscopus drakensteini* Naudé

Evans (1955a) transferred *Bythoscopus drakensteini* to the genus *Eurinoscopus* Kirkaldy, 1906, which Linnavuori (1957) subsequently synonymized with *Batracomorphus* Lewis, 1834. However, the male genitalia of this species show various peculiarities and in some respects resemble those of *Iassus* Fabricius, 1803, e.g. the short plates, the reduction of the styles and presence of anal tube appendages. These characters preclude its inclusion in the genus *Batracomorphus*, as defined by Linnavuori (1957, 1960) and a new genus *Iassomorphus* is therefore proposed. It is characterized as follows:

Head markedly narrower than pronotum; crown only slightly longer medially than next eyes and typically with two small circular dark spots. Frontoclypeus, crown, pronotum and scutellum transversely rugose and typically with brownish and yellowish patches. Anteclypeus parallel-sided. Lateral margins of genae emarginate below eyes. Tegmen with 3 closed anteapical cells and 4 apical cells, rather variable in shape; first apical cell membranous. Appendix broad. Submarginal vein not reaching M3+4 Dorsal surface of fore tibia ridged and with spinulation 1 + 4. Hind femoral setal formula 2 + 2 + 1 (fig. 4). Hind margin of 7th abdominal sternite of female coincident with hind margins of laterotergites (fig. 14).

Pygofer of male, long, usually completely enveloping anal tube in repose; deeply cleft middorsally. Pygofer lobes almost straight ventrally, with few short spines, but no appendages. Anal tube with distinct appendages. Plates short, narrow, pointed, basally fused with one another and completely covered by 8th sternite in repose. Separate valve not developed. Aedeagus situated very far ventrally, actually between plates; small, forked, with gonopore at base of fork. Styles with much reduced apophyses. Connective Y-shaped, short, stout, with curved stem.

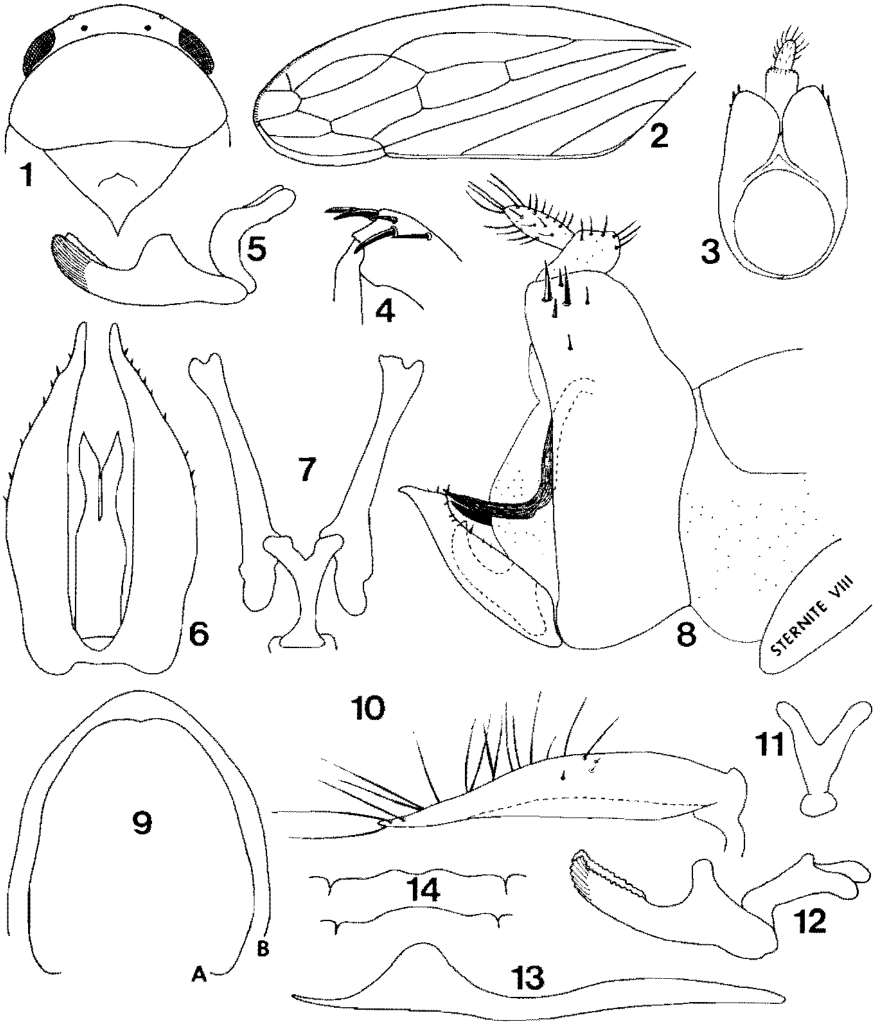
Iassomorphus drakensteini (Naudé), **comb. nov.,** figs 1–9

Bythoscopus drakensteini Naudé, 1926: 19–20
Eurinoscopus drakensteini (Naudé); Evans, 1955a: 28, 29

Ground colour pale green and brown. Length from apex of crown to tips of tegmina 4,3–5,5 mm in male, 5,3–5,7 mm in female. Width of head across eyes 1,5–1,64 mm in male, 1,5–1,7 mm in female. Crown typically with two small circular dark spots (rarely absent) and transverse rugulae, which are also present on the frontoclypeus; sometimes also with yellowish-brown patches.

Pronotum and scutellum transversely rugose, the latter with variable yellowish-brown patches. Maximum width of pronotum in male 1,7–1,8 mm, in female 1,8–2,4 mm; uniformly brown medially and posteriorly, but anterolaterally typically with yellowish area containing dark brown patches; sometimes with two small circular black spots. Tegmina (fig. 2) light green with darker green veins. Female with 7th abdominal sternite almost straight behind and not prolonged posteriorly beyond laterotergites.

MALE GENITALIA. Pygofer narrow but relatively long (fig. 8), deeply cleft middorsally (fig. 3). Pygofer lobes each bearing 3–7 short spines and a few small setae near posterior edge. Anal tube with a pair of sharply pointed blade-like appendages which originate dorsally on sides of anal tube and then curve ventrally and posteriorly.



Figs 1–14. *Iassomorphus* species. 1–9A. *Iassomorphus drakensteini* (Naudé). Lectotype male. 1. Head, pronotum and scutellum, dorsal view. 2. Tegmen. 3. Dorsal view of pygofer. 4. Apex of hind femur. 5. Aedeagus and connective, lateral view. 6. Plates and aedeagus, ventral view. 7. Connective and styles, ventral view. 8. Terminal abdominal segments (evaginated), lateral view. 9A. Outline of eighth sternite. 9B–14. *Iassomorphus cedaranus* (Naudé). 9B–13. Allotype male. 9B. Outline of 8th sternite. 10. Plate, ventral view. 11. Connective, ventral view. 12. Aedeagus and connective, lateral view. 13. Right anal tube appendage, lateral view. 14. Female, variations in hind margin of 7th abdominal sternite; parts of laterotergites shown laterally.

Plates with few short setae along upper outer edges (fig. 6). Large 8th sternite, which is slightly notched behind (fig. 9A), completely covers plates in repose, leading Naudé to believe that discrete plates are not developed.

Aedeagus relatively stout and forked near apex (figs 5 & 6) with gonopore opening between the two fluted points. Styles simple, with apophyses abbreviated and blunt (fig. 7). Connective short, stout, Y-shaped, its posterior extremity, which articulates with the aedeagus, curving ventrally (fig. 5).

MATERIAL EXAMINED. Naudé states that he described this species from 6 females and one male (all collected by F. W. Pettey, Jonkershoek, Stellenbosch, 17.xii. 1922), but only 3 females, labelled "paratype" and one male, labelled "allotype" are now present in the collection. As the holotype female has been lost, the latter male is here designated the lectotype.

The distribution of other material examined is as follows: SOUTH AFRICA: Stellenbosch, C.P.; Klein Drakenstein Mountains, Paarl, C.P.; Knysna, C.P.; Stormsriver Mouth, C.P.; Edenville, O.F.S.; Clarens, O.F.S.; Pretoria, Tvl. SWAZILAND: Mbabane. These specimens were collected throughout the year.

Evans (1955b) recorded *I. drakensteini* from the Congo (Zaïre) basin.

Iassomorphus cedaranus (Naudé), **comb. nov.,** figs 9–14

Bythoscopus cedaranus Naudé, 1926: 20-21
Eurinoscopus cedaranus (Naudé); Evans, 1955a: 28, 30
Batrachomorphus cedaranus (Naudé); Linnavouri, 1961: 454

This species is closely related to *drakensteini* and must therefore also be assigned to the genus *Iassomorphus*.

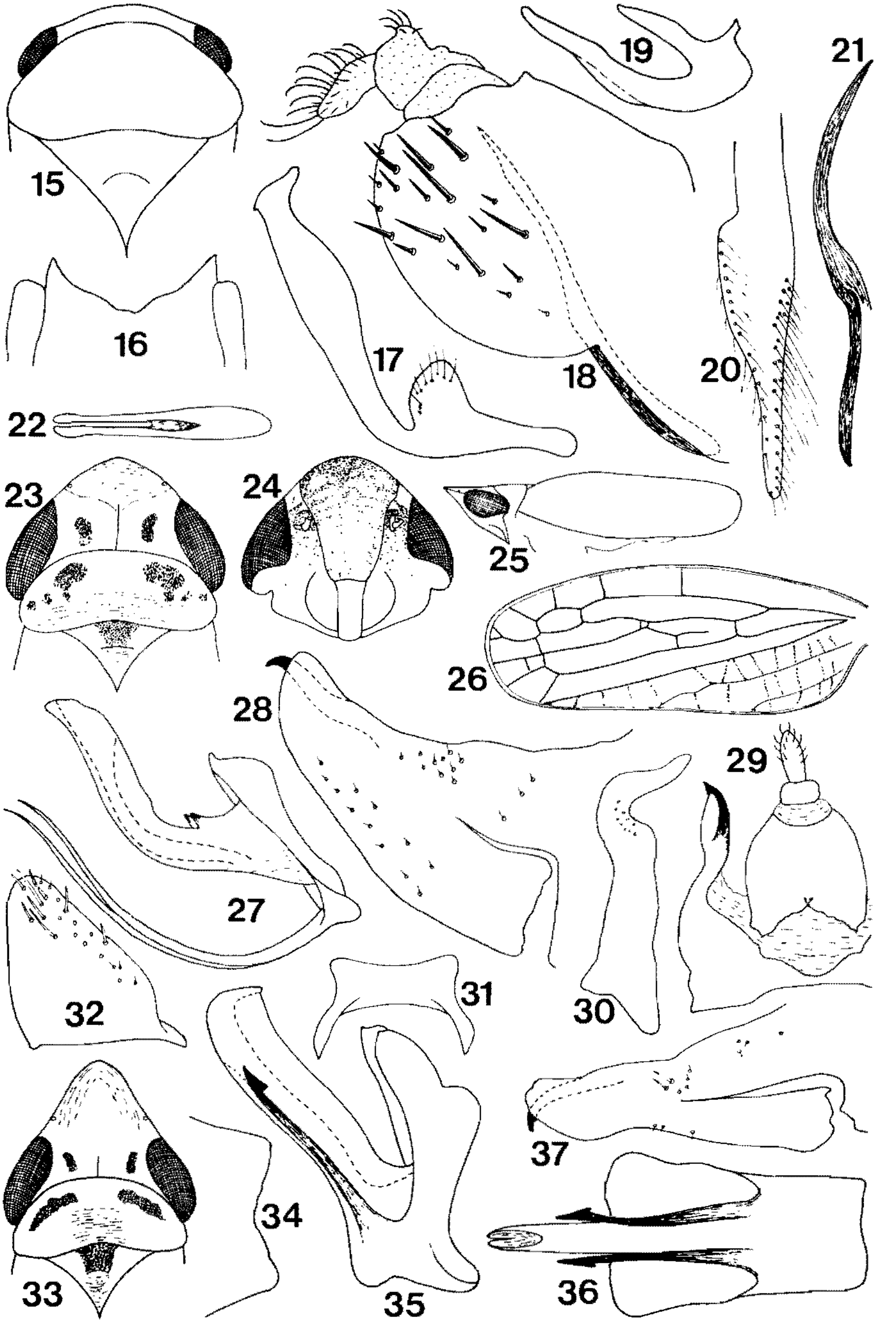
Ground colour variable, greenish to brownish. Length from apex of crown to tips of tegmina 4,5–5,4 mm in male, 5,4–5,8 mm in female.

Head narrower than pronotum, width across eyes 1,45–1,56 mm in male, 1,5–1,6 mm in female. Crown with two small circular dark spots. Head in other respects also as in *drakensteini*. Pronotum, scutellum, tegmina and legs as in *drakensteini*; maximum width of pronotum 1,55-1,8 mm in male, 1,8-2 mm in female. Seventh abdominal sternite of female somewhat variably sinuate behind, not prolonged behind 7th laterotergites (fig. 14).

MALE GENITALIA. Pygofer very similar to that of *drakensteini*, but anal tube appendages relatively straight and parallel with ventral borders of pygofer lobes in repose; each posteriorly with a somewhat twisted lobular expansion near its sharply pointed apex (fig. 13). Plates narrow, each with about 18 long setae along its upper outer

Figs 15–32. *Batracomorphus segregatus* (Naudé) and *Gcaleka laticephala* Naudé. 15–22. *B. segregatus*. 15–16. Holotype female. 15. Head, pronotum and scutellum, dorsal view. 16. Hind margin of 7th abdominal sternite, with laterotergites. 17–22. Male. 17. Right style. 18. Pygofer, lateral view. 19. Aedeagus, lateral view. 20. Right plate, ventral view. 21. Right pygofer process, posterior view. 22. Aedeagus, ventral view. 23–32. *G. laticephala*. Holotype male. 23. Head, pronotum and scutellum, dorsal view. 24. Face. 25. Lateral view of insect. 26. Tegmen. 27. Aedeagus, lateral view. 28. Right pygofer lobe, lateral view. 29. Pygofer and anal tube, dorsal view. 30. Right style, ventral view. 31. Connective, ventral view. 32. Right plate, ventral view.

Figs 33–37. *Gcaleka acuta* Naudé. 33–34. Holotype female. 33. Head pronotum and scutellum, dorsal view. 34. Hind margin of 7th abdominal sternite. 35–37. Allotype male. 35. Aedeagus, lateral view. 36. Aedeagus, ventral view. 37. Right pygofer lobe, lateral view.



Figs. 15—37

edge (fig. 10). 8th sternite large, bluntly rounded behind (fig. 9B). Forked shaft of aedeagus distinctly serrate dorsally and fluted at tips (fig. 12). Anterior arms of connective slightly longer than in *drakensteini* (fig. 11); styles as in latter species.

MATERIAL EXAMINED. Naudé states that he described this species from five females and two males, but at present the collection contains the following specimens, all collected on wattle (*Acacia mearnii* De Wild): 1♀ labelled "type" (Cedara, 2.iii. 1917, E. S. Cogan); 1♂ labelled "allotype" (same data); 1♂ and 2♀ labelled "paratype" (same data); 1♂ labelled "paratype" (New Hanover, 19.x.1913, C. B. Hardenberg).

The distribution of the other material examined is as follows: SOUTH AFRICA: Kirstenbosch, C.P.; Pretoria, Tvl.; Tierpoort, Tvl.; Pietermaritzburg, Natal; Hillcrest, Natal. KENYA: Eldoret.

The above specimens were collected throughout the year.

Iassomorphus cedaranus can easily be distinguished from *I. drakensteini* by the differences in the shape of the anal tube appendages, the shape of the 8th sternite in the male and the length of the setae on the plates. The insect depicted by Skaife (1953) is definitely not *I. cedaranus*. Linnavuori (1969) states that *cedaranus* has a wide distribution in tropical Africa. It is frequently found on wattle and is often erroneously referred to as the wattle "froghopper". According to Connell (1970) it is not known to transmit any virus in wattle, as was often stated in the past.

Batracomorphus segregatus (Naudé), **comb. nov.**, figs 15–22

Bythoscopus segregatus Naudé, 1926: 20
Eurinoscopus segregatus (Naudé); Evans, 1955a: 30

HOLOTYPE FEMALE. Length from apex of crown to tips of tegmina 5,7 mm; width across eyes 1,84 mm; maximum width of pronotum 2,04 mm. General body colour yellowish-brown (probably discoloured). Pronotum 5 times as long as crown. Disc of pronotum and scutellum rugulose. Tegmen punctate, brownish, with 3 anteapical and 4 apical cells. 7th abdominal sternite strongly concave behind and laterally prolonged beyond hind margins of laterotergites (fig. 16).

MATERIAL EXAMINED. Naudé originally described this species from two females, but at present only the holotype (labelled "type") described above (collected by F. W. Pettey, Jonkershoek Valley, 17.xii.1922) is present in the collection. A number of other males and females, closely resembling the holotype in size and other characteristics (but greenish in colour) and collected in the type locality and other parts of the Western Cape, were however available for study. Some of these males, apparently conspecific with the holotype, show small and seemingly inconstant variations in the width of the styles and pygofer processes; the genitalia of a male collected at Jonkershoek, Stellenbosch (J. G. Theron, 29.i.1968) are described below:

Pygofer well developed dorsally; not deeply cleft. Pygofer lobes broad, angular behind, rounded below and each bearing about 12 relatively short spines (fig. 18). Pygofer process slender, relatively straight and sharply pointed, terminating near posterodorsal margin of pygofer lobe (figs 18 & 21). Plates long, hairy, abruptly widened some distance from base (fig. 20). Aedeagus as in figs 19 and 22, with ventral gonopore; length of shaft 0,042 mm. Styles as in fig. 17; length of apophysis 0,07 mm. Apophysis with small subapical tooth on outside of foot-like extremity. Basal part of connective expanded and hollow.

The species *segregatus* undoubtedly belongs to the genus *Batracomorphus*. In the present study, types of *Bythoscopus subolivaceous* Stål were unfortunately not available for comparison with *segregatus*. Naudé's criteria for distinguishing between *segregatus* and *subolivaceous*, i.e. colour and the ratio between length of vertex and length of pronotum, are not very reliable. The length of the vertex (in dorsal view) is affected by the inclination of the head of the specimen.

NARECHO Jacobi, 1910

Narecho Jacobi, 1910: 127
Parabolitus Naudé, 1926: 37, **syn. nov.**

Narecho anceps (Naudé), **comb. nov.**

Parabolitus anceps Naudé, 1926: 37–38
Narecho erinae Theron, 1971: 3–4, **syn. nov.**

This species is in all respects identical with *Narecho erinae* Theron (Nirvaninae), of which a detailed description has already been published (Theron, 1971). *Parabolitus anceps* is therefore renamed *Narecho anceps* (Naudé). Linnavuori (1961) assigned a new species of Hecalini, namely *foliaticeps*, to the genus *Parabolitus*, but this is obviously wrong.

MATERIAL EXAMINED. Naudé described this species from two males collected by F. W. Pettey at Jonkershoek on 17.xii.1922. Both specimens are still present in the collection and the male labelled "type" is here accepted to be the holotype.

The distribution of other material examined is as follows: SOUTH AFRICA. C.P.: Stellenbosch; Viljoen's Pass; Sir Lowry's Pass; Kommetjie; Cape Flats; Baardskeerdersbos. All specimens were collected from December to February.

GCALEKA Naudé, 1926

Type-species: *Gcaleka laticephala* Naudé

The genus *Gcaleka* was assigned to the Aphrodini by Evans (1947) and is also listed under this tribe by Metcalf (1963). Linnavuori (1961) refers it to the Hecalini, but its true affinities probably lie with the Euscelini, especially the genus *Bonaspeia* Linnavuori, 1961. The following are the main characters of the genus:

Brownish leafhoppers with head wider than pronotum and tegmina in repose with humped profile. Crown acutely angled with face; ocelli on anterior margin of crown and fairly distant from eyes. Coronal suture long. Frontal region of crown rugulose, discal region with areas showing fine nodular sculpture. Frontoclypeus broadening upwards, marked with yellowish arcs; ocellocular region broad. Anteclypeus broadening slightly apically and not extending beyond genae. Width of gena below lorum not more than 1/3 width of ocellocular region. Gena rectangularly notched below eye. Anterior tentorial arms forked.

Pronotum short, lateral margins weakly carinate; anteriorly with fine nodular sculpture in certain areas, posteriorly regulose. Scutellum in front of transverse impression with nodular sculpture, rugulose behind. Tegmina coriaceous, no appendix, three closed anteapical cells and number of supernumerary veins, especially in the clavus. Spinulation of fore tibia 1+4 (unknown in *laticephala*); hind femoral setal formula 2+2+1.

Tenth tergite of male very large and pygofer deeply incised dorsally. Pygofer lobes narrow, triangular and without large spines; posterodorsally with short hooked process. Lateral membranous fold rectangularly bent. Valve short but broad. Plates free, triangular, ventrolaterally with irregularly arranged spines.

Aedeagus symmetrical, articulating with connective and with single gonopore; socle with two long appendages. Stem and divergent arms of connective very short. Styles narrow, with apophyses diverging; preapical angles and ventral arms reduced.

The two known species of *Gcaleka* described below, are easily separated by the length of the crown and the structure of the aedeagus.

Gcaleka laticephala Naudé, figs 23–32

MALE. Length from apex of crown to tips of tegmina 5,25–5,33 mm. General body colour yellowish-brown, but dark brown areas also present. Head considerably wider than pronotum (fig. 23), width across eyes 1,88 mm. Crown flat, 1,3 times length of pronotum, medial length 0,8 mm, with apex angled and anterior margin sharp. Medially with dark brown area. Frontal region of crown slightly sunken and weakly rugulose, discal region with two oblong elevated areas showing fine nodular sculpture. Coronal suture distinct. Frontoclypeus dark brown with yellowish arcs (fig. 24); anteclypeus slightly broader at apex; gena sharply notched below eye.

Pronotum with fuscous areas, maximum width 1,68 mm; anterolaterally with areas showing fine nodular sculpture, posterior half with transverse rugulae. Scutellum anterior to transverse impression with fine nodular sculpture, rugulose behind.

Tegmen yellowish-brown with dark brown veins. No appendix (fig. 26). Three closed anteapical cells. Supernumerary veins present, especially in clavus. Profile of tegmina in repose humped (fig. 25). Hind femoral setal formula 2+2+1 (fore tibiae broken off).

MALE GENITALIA. Anal tube with very broad, well-sclerotized tenth tergite (fig. 29). Pygofer lobes narrow, triangular, their dorsal connexion very short; each lobe terminally with slightly curved spine-like process extending slightly beyond lobe (fig. 28). Lobes bare, except for some minute setae. Valve triangular, broad but short. Plates triangular with about 15 irregularly arranged spines on outer edge (fig. 32).

Aedeagus symmetrical, with curved shaft bearing two small teeth anteriorly near base (fig. 27). Gonopore dorsal. Socle short, circular, ventrally with a pair of long, slender, sharply pointed appendages. Aedeagus articulated with connective; anterior arms of latter widely divergent and short (fig. 31). Styles with inconspicuous preapical angles; apophyses bent outwards (fig. 30).

FEMALE. Unknown.

MATERIAL EXAMINED. Naudé described this species from two males (labelled "type" and "paratype" respectively) collected at Ceres (iv.1923) by F. W. Pettey and these are still the only known specimens of the species.

Gcaleka acuta Naudé, figs 33–37

FEMALE. Length from apex of crown to tip of abdomen 5,5–6,3 mm. General body colour yellowish-brown to dark brown; crown and medial part of thorax typically yellowish-brown. Head wider than pronotum, width across eyes 1,6–1,8 mm (fig. 33). Crown flat, acutely angulately produced, 1,8–2,1 times as long as pronotum, varying somewhat in shape and apex slightly curved upwards; medial length 1–1,26 mm. Frontal region of crown rugulose, but usually not sharply separated from discal region, which bears two small areas with fine nodular sculpture. Coronal suture usually long, extending beyond level of ocelli; sometimes indistinct. Frontoclypeus elongated, usually with yellowish arcs; anteclypeus distinctly broader at apex.

Maximum width of pronotum 1,5–1,7 mm; sculpture of pronotum and scutellum fairly similar to that of *laticephala*. Tegmina shorter than abdomen, profile in repose humped, usually darker brown in colour than head and thorax. Spinulation of fore tibia 1+4. Hind femoral setal formula 2+2+1. Hind margin of 7th abdominal sternite broadly V-shaped (fig. 34).

MALE. Length from apex of crown to tips of tegmina 4,8–5,8 mm. Colouration same as female. Crown 1,8–2 times as long as pronotum, medial length 1–1,24 mm. Width of head across eyes 1,5–1,7 mm. Tegmina usually completely covering abdomen in repose.

MALE GENITALIA. Pygofer, anal tube, plates, valve, styles and connective very similar to those of *laticephala*, but pygofer lobes even more slender (fig. 37); aedeagus however markedly different (figs. 35 & 36). Shaft almost straight, with gonopore on ventral side, at apex. Socle large and bearing a thin uncinate appendage on each side of shaft. In some specimens these appendages are almost contiguous behind the shaft, but in others they show progressive lateral and anterior displacement, so that they may even arise from the socle anterior to the shaft.

MATERIAL EXAMINED. Naudé originally described this species from 4 males and 4 females, but his type material now consists of only 1 female (labelled "type"), 1 male (labelled "allotype") and 1 female (labelled "paratype"). All were collected by F. W. Pettey at Ceres (iv.1923) and the first-named specimen is here designated the holotype.

Many other specimens from the Western Cape (SOUTH AFRICA), i.e. from Stellenbosch, Rawsonville, Ceres, Kleinmond, Herold, Cape Flats, Villiersdorp, Viljoen's Pass and Pearly Beach, were however also available for study; the dates of collection of these specimens range from December to April.

REFERENCES

CONNELL, A. D. 1970. Aspects of the morphology and bionomics of *Batrachomorphus cedaranus* (Naudé) and *Lygidolon laevigatum* Reut. (Hemiptera) on black wattle (*Acacia mearnii* De Wild). Unpublished Thesis, Univ. Natal, Pietermaritzburg.

EVANS, J. W. 1947. A natural classification of leafhoppers (Jassoidea). Part 3. Jassidae. *Trans. R. ent. Soc. Lond.* **98:** 105–271.

———— 1955a. Cicadellidae (Hemiptera Homoptera). *Explor. Parc natn. Upemba Miss. G. F. de Witte* **37:** 1–44.

———— 1955b. Cicadellidae (Hemiptera Homoptera). *Explor. Parc natn. Albert Miss. G. F. de Witte* **84:** 1–23.

LINNAVUORI, R. 1957. Remarks on the Iassinae (Hom. Cicadellidae). *Suom. hyönt. Aikak.* **23:** 144–50.

———— 1960. Insects of Micronesia. Homoptera: Cicadellidae. *Insects Micronesia* **6:** 231–344.

LINNAVUORIR, 1961. Hemiptera (Homoptera): Cicadellidae. *In* Hanström, *et al.*, *S. Afr. Animal Life* **8:** 452–86.

——— 1969. Contribution a la faune du Congo (Brazzaville). Mission A. Villiers et A. Descarpentries XCIII. Hémiptères Hylicidae et Cicadellidae. *Bull. Inst. fr. Afr. noire* (A) **31:** 1129–85.

METCALF, Z. P. 1963. General catalogue of the Homoptera. Fascile VI Cicadelloidea Part 8. Aphrodidae. U.S. Dep. Agric., Washington, 268 pp.

NAUDÉ, T. J. 1924. A new jassid. *S. Afr. J. nat. Hist.* **4:** 307.

———1926. Cicadellidae of South Africa. A taxonomic and faunistic study. *Entomology Mem. Dep. Agric. Un. S. Afr.* **4:** 1–106.

SKAIFE, S. H. 1953. African insect life. Longmans Green, Cape Town.

THERON, J. G. 1971. Two new species of Cicadellidae (Hemiptera) from the Western Cape. *Novos Taxa ent.* **94:** 1–6.

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